

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
29 June 2000 (29.06.2000)

PCT

(10) International Publication Number  
**WO 00/38094 A3**

(51) International Patent Classification?: **G06F 17/60**

(21) International Application Number: **PCT/US99/30640**

(22) International Filing Date:  
22 December 1999 (22.12.1999)

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:  
60/113,502 22 December 1998 (22.12.1998) **US**

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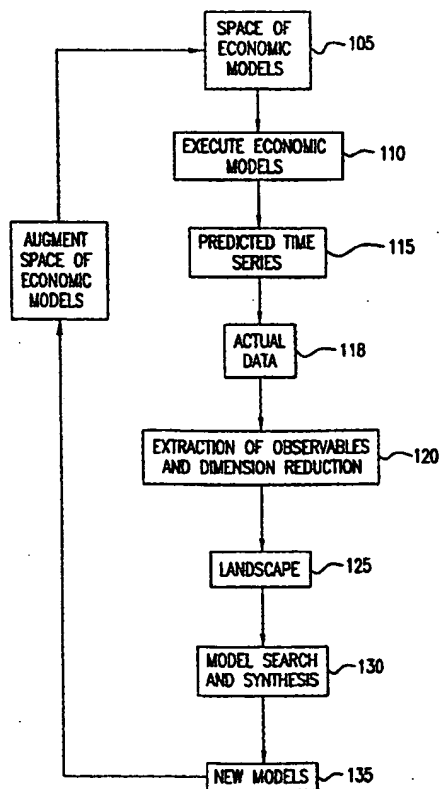
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(81) Designated States (national): **AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO,**

[Continued on next page]

(54) Title: **A SYSTEM AND METHOD FOR THE ANALYSIS AND PREDICTION OF ECONOMIC MARKETS**



(57) Abstract: The present invention presents a system and method of economic analysis and prediction which dynamically adapts to a changing economic environment by selecting or synthesizing an economic model from a set of economic models based on the selected model's ability to make accurate predictions about an actual economic market. Specifically, the method and system of the present invention forms a space of different economic models (105), forms a behavioral landscape by extracting observables from executions of the economic models (120), and performs model selection and composite model synthesis through optimization (130) over the behavioral landscape.

WO 00/38094 A3



RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG,  
US, UZ, VN, YU, ZA, ZW.

**Published:**

— *With international search report.*

(84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(88) **Date of publication of the international search report:**  
18 January 2001

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/30640

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 17/60

US CL :705/36

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/36, 35, 37

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ENGLE R.F. "Statistical Models for Financial Volatility", Financial Analysis Journal, January 1993, v49 n1, pages 72-78.	1-26
A	KIM D. et al, "Alternative Models for the Conditional Heteroscedasticity of Stock Returns", Journal of Business, October 1994, v67 n4, page 563.	1-26
A	US 5,630,127 A (MOORE et al) 13 May 1997, see the abstract, col. 30 lines 9-16.	1-26
A	US 5,765,143 A (SHELDON et al) 09 June 1998, see col. 14 lines 61-66.	1-26
A	US 5,799,287 A (DEMBO) 25 August 1998, see the abstract.	1-26

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*E* earlier document published on or after the international filing date	*Y* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

30 SEPTEMBER 2000

Date of mailing of the international search report

25 OCT 2000

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/30640

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, E	US 6,049,783 A (SEGAL et al) 11 April 2000, see the abstract.	1-26
A, E	US 6,061,662 A (MAKIVIC) 09 May 2000, see the abstract.	1-26

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/30640

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-26

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/30640

### B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

#### STN, DIALOG

search terms: predict, forecast, model, analyze, stock market, option, equity, bond, security, portfolio, NASDAQ, AMEX, NYSE, gaussian, statistic, time series, arv, arch, garch, black scholes, langevain, levy, select, choose, use, pick, best, fitness, accuracy

### BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claim(s) 1-26, drawn to analyzing and predicting the economic markets using a plurality of economic models and generating a time series of them.

Group II, claim(s) 27-48, drawn to analyzing and predicting a securities market wherein the program models dealers, investors and various rules.

Group III, claim(s) 49-67, drawn to creating a portfolio of assets by generating smaller and smaller portfolio of assets to determine and search an optimal portfolio.

Group IV, claim(s) 68-74, drawn to optimizing a portfolio of assets by determining an optimal fitness landscape representation of portfolios.

Group V, claim(s) 75-89, drawn to creating a portfolio of assets utilizing anti-correlated families.

Group VI, claim(s) 90-100, drawn to modeling a portfolio utilizing gaussian statistics.

The inventions listed as Groups I-VI do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: each group is separate and distinct from each other.